

WHAT IS CLAIMED IS:

1. A semiconductor apparatus comprising:

a light input/output portion provided in an upper portion of a semiconductor substrate, the light input/output portion having an opening region for light associated to the light input/output portion to pass through;

a transparent film covering the opening region;

and

an interlayer lens provided on the transparent film, the interlayer lens positioned such that an optical axis of the interlayer lens is parallel to a central axis of the opening region.

2. A semiconductor apparatus according to claim 1, wherein the light input/output portion includes a light receiving portion for receiving light.

3. A semiconductor apparatus according to claim 1, wherein the transparent film is provided with step portions so as to have a concaved surface, and a concaved portion cover the opening region.

4. A semiconductor apparatus according to claim 1, wherein the optical axis of the interlayer lens is aligned with the central axis of the opening region.

5. A semiconductor apparatus according to claim 1, wherein a refractive index of the transparent film is lower than a refractive index of the interlayer lens.

6. A semiconductor apparatus according to claim 5, wherein the transparent film includes a silicon oxide film including at least one of phosphorous (P) and boron (B).

7. A semiconductor apparatus according to claim 5, wherein the transparent film includes an organic high polymer film.

8. A semiconductor apparatus according to claim 1, wherein the transparent film is formed by patterning using selective etching.

9. A semiconductor apparatus according to claim 8, wherein the transparent film is formed by a thermal process after the patterning.

10. A semiconductor apparatus according to claim 1, further

comprising:

a transfer channel provided so as to have a predetermined space from the light input/output portion;

an insulating film provided on the semiconductor substrate, the light input/output portion and the transfer channel;

a transfer electrode provided so as to oppose the transfer channel via the insulating film; and

an insulating film provided with an opening for exposing the opening region of the light input/output portion and in which step portions are produced by covering the transfer electrode.

11. A semiconductor apparatus according to claim 10, wherein the optical axis of the interlayer lens is aligned with the central axis of the opening.

12. A method for fabricating a semiconductor apparatus comprising:

forming a light input/output portion having an opening region for passing through associated light in an upper portion of a semiconductor substrate,

forming a transparent film so as to cover the opening region; and

forming an interlayer lens provided on the transparent film, the interlayer lens being formed such that an optical axis of the interlayer lens is parallel to a central axis of the opening region.

13. A method for fabricating a semiconductor apparatus according to claim 12, wherein forming the light input/output portion includes forming a light receiving portion for receiving light as the light input/output portion.

14. A method for fabricating a semiconductor apparatus according to claim 12, further comprising forming a light shield film provided with an opening for exposing the opening region of the light input/output portion.

15. A method for fabricating a semiconductor apparatus according to claim 12, wherein forming the interlayer lens includes forming the interlayer lens such that the optical axis of the interlayer lens is aligned with the central axis of the opening region.

16. A method for fabricating a semiconductor apparatus according to claim 12, wherein forming the transparent

film includes selectively etching and patterning the transparent film.

17. A method for fabricating a semiconductor apparatus according to claim 16, wherein forming the transparent film includes performing a thermal process after patterning.

18. A method for fabricating a semiconductor apparatus according to claim 16, wherein forming the transparent film includes flattening a surface of the transparent film before the step of patterning.